ORIGINAL RESEARCH PAPER

Volume-8 | Issue-4 | April-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ETIOLOGICAL PROFILE OF PATIENTS WITH NEOVASCULAR GLAUCOMA: A HOSPITAL BASED PROSPECTIVE STUDY.

Ophthalmology

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ABSTRACT

Objectives: This study was to evaluate the etiology of patients with neovascular glaucoma.
Methods: Detail history of patients and complete examinations of both eyes were performed to all cases. Vision, refraction, slit lamp, biomicroscopy, fundus examination, analysis of intraocular pressure (IOP) and gonioscopy were performed to all cases of neovascular glaucoma.
Results: Data was analyzed by using simple statistical methods with the help of MS-Office software.
Conclusions: Older age group patients were commonly affected with neovascular glaucoma. Majorities of cases were no PL and vision 5/60 to HM+. On gonioscopy, close angle and open angle with synechiae were commonly seen. Major systemic etiology of neovascular glaucoma was hypertension and diabetes mellitus. Central retinal vein occlusion (CRVO), proliferative diabetic retinopathy (PDR) and ocular ischemic syndrome (OIS) cases were commonly developed to NVG. Hence, NVG is a potentially devastating ocular disorder where delayed diagnosis or inadequate treatment can result in loss of vision or, sometimes, loss of the globe itself.

KEYWORDS

Neovascular glaucoma, gonioscopy, hypertension, DM, CRVO, PDR

INTRODUCTION

History of NVG began in 1906, when neovascularization was first reported by Coats in the histopathologic specimens of the iris of patients with central retinal vein occlusion (CRVO), and later on in patients with diabetes by Salus. [1,2] Since then, cumulative data provided better understanding of the relation between neovascularization and chronic synicheal angle closure.[3] It was not until 1963 when Weiss et al. suggested the term neovascular glaucoma to replace the older terms, such as Hemorhagic glaucoma, thrombotic glaucoma, congestive glaucoma, rubeotic glaucoma, diabetic hemorrhagic glaucoma, and 100 day glaucoma.[4] NVG is a serious, yet preventable, complication with significant potential for visual loss. Once NVG is well established, the likelihood for successful outcome is markedly reduced. [11]

Retinal vein occlusion (RVO), after diabetic retinopathy, is the second most common cause of retinal vascular abnormality in adults .On the basis of the occlusion site it is divided into 3 types (a) branch retinal vein occlusion (BRVO), (b) CRVO and (c) hemiretinal vein occlusion (HRVO) based on.[6] CRVO is further subdivided into ischemic and non-ischemic types. The latter being the milder type with only partial venous obstruction and good visual prognosis, while ischemic CRVO is associated with severe visual loss, due to nearly total retinal vein obstruction.[5] Upto 16.4 million adults worldwide are affected by RVO, with over 90% of them being above the age of 65 years.[5,7] More than half of these cases have an associated systemic disorder (e.g. hypertension, hyperlipidemia, diabetes mellitus or systemic vasculitis).[8,9] In addition to these well-known classical risk factors, hyperhomocysteinemia appears to play a significant role in the pathogenesis of this disease,[9] and is considered the most common "emerging" risk factor related to RVO.[10] Objectives of our study were to evaluate the various etiology of patients with neovascular glaucoma.

MATERIALS & METHODS

This present study was conducted in department of Ophthalmology, VIMS, Pawapuri, Nalanda, Bihar, India during a period from March 2018 to January 2019. Entire subjects signed an informed consent approved by institutional ethical committee of VIMS, Pawapuri, Nalanda, Bihar, India was sought.

A total of 50 cases of neovascular glaucoma (30: males, 20: females) were enrolled in this study.

METHODS:

Detail history, clinical examinations and relevant investigations were performed to all cases.

Detail history includes: History of presenting complaints, past history of patients with particular reference to diabetes mellitus, hypertension, cardiovascular disease, history of chronic steroid intake, uveitis, glaucoma, trauma and history of recent onset of defective vision were elicited.

Examinations: Complete examinations of both eyes were performed to all cases. B scan and field charting were performed to all relevant patients. Vision, refraction, slit lamp, biomicroscopy, fundus examination, analysis of intraocular pressure (IOP) and gonioscopy were performed to all cases of neovascular glaucoma.

STATISTICALANALYSIS

Data was analyzed by using simple statistical methods with the help of MS-Office software.

OBSERVATIONS

A total of 50 cases of neovascular glaucoma were enrolled in this study. Male and female ratio was 3:2.

Table.1. Showing age wise distribution of patients with NVG.

Age group (Years)	No. of cases	Percentage of cases
20-35	2	4%
36-50	10	20%
51-65	14	28%
>65	24	48%
Total	50	100%

In this present study majority of cases (48%) were in age group of greater than 65 years.

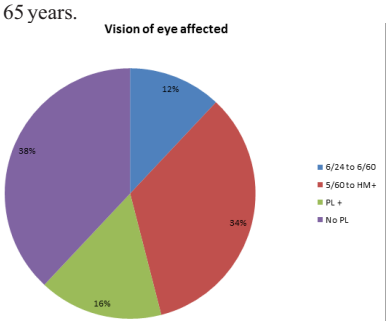

Figure.1. Showing the vision of eye affected of patients with NVG.

In this present study, majorities of cases (38%) were no PL. 34% cases were vision 5/60 to HM+.

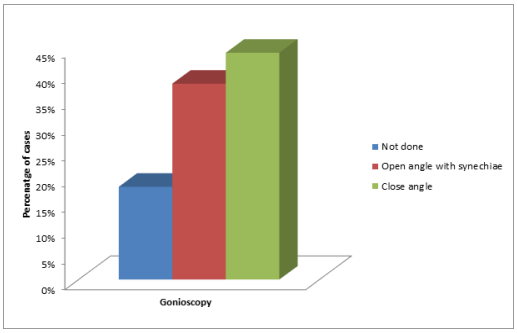

Figure.2. Showing the gonioscopy findings patients with NVG.

Gonioscopy was not done in 18% cases. And rest all cases were under gone gonioscopy. Majorities of cases (44%) were close angle.

Table.2. Showing on the basis of systemic disease of patients with NVG.

Systemic disease	No. of cases	Percentage of cases
Nil	9	18%
DM+HTN+CAD	2	4%
HTN+CVA	1	2%
DM+CAD	1	2%
DM+HTN	6	12%
CAD	1	2%
HTN	17	34%
DM	13	26%
Total	50	100%

In this present study, 18% cases were no any systemic disease. Majorities of cases (34%) were hypertension. 26% cases were diabetes mellitus. 12% cases were diabetes mellitus with hypertension.

Table.3. Showing based on the causes of neovascular glaucoma patients.

Causes	No. of cases	Percentage of cases
Post radiotherapy	1	2
Coats disease	1	2
BRVO	3	6
CRAO	2	4
OIS	3	6
Chronic uveitis	5	10
CRVO	13	26
PDR	16	32
Unknown	6	12
Total	50	100%

In this present study, majorities of cases (32%) were PDR. 26% cases were CRVO. And 12% cases were unknown etiology.

DISCUSSIONS

Neovascular glaucoma (NVG) is a severe form of glaucoma with devastating visual outcome attributed to new blood vessels obstructing aqueous humor outflow, usually secondary to widespread posterior segment ischemia. Invasion of the anterior chamber by a fibrovascular membrane initially obstructs aqueous outflow in an open-angle fashion and later contracts to produce secondary synechial angle-closure glaucoma.[11] The full blown picture of NVG is characteristized by iris neovascularization, a closed anterior chamber angle, and extremely high intraocular pressure (IOP) with severe ocular pain and usually poor vision. [11]

In this present study, majorities of cases of neovascular glaucoma were male. And older age (>65 years) cases were commonly seen with neovascular glaucoma.

Similar findings were obtained by Cheng-Wen Su, et al. (2017), [12] In their study, male and older age group cases were commonly suffered with neovascular glaucoma.

In this present study, 12% cases were vision 6/24 to 6/60. 16% cases were vision PL+. 34% cases were vision 5/60 to HM+. And 38% cases were no PL.

After the gonioscopy findings, most of the cases of NVG were close angle (44%) and open angle with synechiae (38%). Hypertension (34%), diabetes mellitus (26%), DM with HTN (12%) and CAD with HTN and DM (4%) were most common systemic finding of patients with neovascular glaucoma in this present study.

NVG is as the presence of iris and anterior chamber (AC) angle neovascularization with elevated IOP, but IOP much >21 mmHg. Poor control of diabetes mellitus and hypertension was once generally considered the most common risk factors for NVG.[17] Critically, based on the amounts of investigations and experimental researches, the pathophysiological basis of neovasculature (NV) or NVG is retinal capillary nonperfusion, retinal ischemia, or uveal capillary insufficiency caused by various primary or secondary diseases, such as proliferative diabetic retinopathy (PDR), ischemic retinal venous obstruction (RVO), ocular ischemic syndrome (OIS), and some uncommon ocular causes such as uveitis, ocular tumours, and miscellaneous retinal diseases.[17] In contrast to original compensation, the neovascularization brought pathological disaster rather than improving circulation to the eye. Around 40%~45% of ischemic retinal venous occlusion eyes would develop NVG, and 80% of them would happen within 6–8 months, especially in the first quarter.[13,14] For PDR patients, there are 22% suffered NVG, majorly bilaterally; intraocular surgeries such as cataract surgery or vitrectomy would promote NVG progressing in DR cases.[15] As to OIS, NVG can occur in about 68% eyes and the risk increases with the length of time between symptom onset and diagnosis, as well as with the severity of ipsilateral carotid artery stenosis.[16]

In this present study, most of the patients with NVG were BRVO (6%), OIS (6%), chronic uveitis (10%), CRVO (26%), PDR (32%) and unknown etiology (12%).

CRVO is one of the most common retinal vascular disorders that may lead to blindness. It usually affects older patients, with over 90% cases being over the age of 65 years. Hypertension, diabetes, atherosclerosis and hypercoagulable states are all considered as its predisposing factors, in addition to the various local ophthalmic conditions such as open angle glaucoma, ocular trauma and orbital infections.[5]

Vascular endothelium growth factor (VEGF) has been recognized the most important factor to neovascularization. Besides verifying the highly elevated concentration of VEGF in the aqueous humor of NVG eyes, Yu et al. (2007) [18] had revealed increased levels of hepatocyte growth factor (HGF), transforming growth factor beta1 (TGF β1) and beta2 (TGF β2) in the aqueous humor of patients with NVG by enzyme linked immunosorbent assay, along with highly expressed TGF β1 and β2 in the neovascular membrane, iris stromal cells, and ciliary cells by immunohistochemical staining. Tripathi et al. (1992) [19]also confirmed the higher levels of TGFβ1 and interleukin 6 in patients with refractory NVG secondary to PDR. Furthermore, it was also found a possible involvement of basic fibroblast growth factor (bFGF) in the pathogenesis of NVG.[12]

CONCLUSIONS

This present study concluded that the older age group patients (> 50 years) were commonly affected with neovascular glaucoma. Majorities of cases were no PL and vision 5/60 to HM+. On gonioscopy, close angle and open angle with synechiae were seen in majorities of cases. Major systemic etiology of neovascular glaucoma was hypertension and diabetes mellitus. Central retinal vein occlusion (CRVO), proliferative diabetic retinopathy (PDR) and ocular ischemic syndrome (OIS) cases were commonly developed to NVG. Hence, NVG is a potentially devastating ocular disorder where delayed diagnosis or inadequate treatment can result in loss of vision or, sometimes, loss of the globe itself. Early diagnosis of the disease with identification of the underlying cause, followed by immediate and aggressive treatment, is the key to better visual outcome.

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